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09/837,210	04/19/2001	Masanori Ogura	35.C15304	6939

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EXAMINER

BAUMEISTER, BRADLEY W

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 06/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/837,210

Applicant(s)
Ogura et al.

Examiner
B. William Baumeister

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Mar 17, 2003
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-12, 17-21, 31-34, and 37-40 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-12, 17-21, 31-34, and 37-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 6) ☐ Other: _____

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 10-12, 17-21, 31-34 and 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takemoto as applied to the claims above, and further in view of Applicant's Prior Art admissions.

a. Takemoto discloses a color (R, G, B: e.g., col. 2, lines 13-) photodetector array wherein each pixel includes a n-p photodiode junction 22/25. The photodiode is connected to at least one MOS transistor including insulated gate 24 and drain 23 that are also formed on/in p-well 25, but alternative or additional switching elements such as additional transistors may also be disposed for each pixel element (col. 5, lines 30-45). P-well 25 is common to all of the pixels in the array (see e.g., FIG 8c) and is formed on an oppositely-doped n-substrate 21. The p-well 25 also includes a well contact region 30 and wiring 28 for maintaining a bias between the common well and the substrate by means of outside power source 29. Other features include reflection (light interception) film 167 (FIG 16B); insulating field oxide pixel isolation region 26'; and color filters (e.g., col. 14, lines 60-).

i. Regarding the claim language that plural two-dimensional arrays are "placed in juxtaposition on a substrate:"

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(1) Takemoto's $X \times Y$ pixel array can be viewed as being composed of a plurality of subportions of $a \times b$ pixel groups wherein $a < X$ and $b < Y$. Also, any or each $a \times b$ subportion itself--wherein at least one of a and b is greater than 1--can also be labeled as "a two-dimensional pixel array." Thus, the Takemoto array can alternatively be labeled as comprising a plurality of pixel arrays in a common substrate, as set forth by the claims.

(2) Further, Takemoto discusses that color filters are typically placed over the array in a mosaic pattern to cause the array to absorb the particular colors (col. 3, lines 40-). Under a second interpretation, the Takemoto array can be labeled as being composed of a first, red-detecting array; a second, green-detecting array and a third, blue-detecting array; and wherein the three arrays are disposed in an interlaced juxtaposition in the common well.

ii. Regarding claim 20, the term, "common filter" may be interpreted to mean either a single, continuous member that filters light for a plurality of pixels, or alternatively, a single member or a plurality of discontinuous members that filter light in the same or "a common" manner, such as a plurality of blue, green or red filters, disposed over respective pixels. As such, since Takemoto discloses that the pixels of the array are respectively filtered to detect red, green or blue in the respective pixels, each of the individual red filters, for example, in combination can be interpreted to be "a common filter" under the second interpretation.

b. Regarding the further limitation of the independent claims that a well wiring and contact are disposed between the first and second arrays, as was explained above, Takemoto teaches that well wiring 28 and contact 30 are disposed on/in the common well 25, and depicts

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these structures as being disposed at the periphery of the well, but does not appear to disclose whether the contact may be placed in alternative areas or whether plural contacts may be employed.

i. Applicant acknowledges (see e.g., FIG 11 and the associated discussion on the background section of the specification) that it was known to provide plural separate PD arrays 64-66 disposed in juxtaposition on a common substrate wherein each individual array or array group is filtered so as to detect only one respective wavelength of R, G and B, for example, by means of focusing lenses 61-63 (claims 36, 28 and 40) and common color filters. Applicant also acknowledges that it was known that operable photodetector arrays may be formed such that the plural array groups that constitute the array are disposed spatially separated on a common substrate.

ii. Generally, it would have been obvious to one of ordinary skill in the art at the time of the invention that (1) the common-well-bias wiring 28 and associated contact 30 could be placed anywhere within the common well 25 since the goal is to provide the same potential to generally the entire well region 25; and (2) that depending on the total size of the Takemoto array, additional wiring contacts could also be made to the common well 25 for any of various purposes such as to provide redundancy to safeguard against potential defects in the semiconductor and conductor materials; to reduce the wiring's effective resistance by providing a plurality of wiring paths and/or to improve the photodetector's performance by reducing the negative effects of potential material defects and parasitic electric charges and fields and thereby better insure that all

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portions of the well will be more evenly biased as intended. *See e.g., In re Harza*, 124 USPQ 378, 380 (CCPA) (1960) for the proposition that “[i]t is well settled that the mere duplication of parts has no patentable significance unless a new and unexpected result is produced[.]” Thus, the only remaining issue is whether it would have further been obvious to have specifically disposed the common-well contact(s) between pixel groups (or arrays) of the Takemoto multicolor detector array.

iii. Since it was known to those skilled in the art at the time of the invention that a photodetector array (or plurality of arrays or array groups) may be disposed such that its entire internal portion is not devoted to pixels for detection functions, but rather includes non-pixel portions that separate sections of the array, as admitted by Applicant, it would have been obvious to one of ordinary skill in the art at the time of the invention to have disposed one or more common-well contacts in that particular portion of the common well that is between various pixel groups (or arrays), for at least the purposes of providing wiring redundancies; reducing wiring resistance and/or improving the photodetector’s performance by better insuring that all portions of the common well--that would otherwise be located within the array’s interior--will be more evenly biased as intended. Also, these goals would increase in significance as the size of the photodetector array is increased, a common goal in the semiconductor industry. Further, the provision of common-well wirings and contacts in between particular array groups or portions does not produce any unexpected results. Rather, increasing the number of internal-array locations for the common-well wiring/contacts produces the conventionally expected results of

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reducing the area that may be devoted to photodetection while increasing the reliability of the pixels remaining in the array(s). *See e.g., Lemelson v. Synergistics Research Corp.*, (DC SNY) 4 USPQ2d 1927, 1934 for the proposition, “[i]t is well settled that more than mere change of form or rearrangement of parts is necessary for patentability. *Span-Deck, Inc. v. FabCon, Inc.*, 677 F.2d 1237, 1244 [215 USPQ 835, 840-841] (8th Cir.) (citing cases), cert. denied, 459 U.S. 981, 103 S.Ct. 318 (1982); *Sheldon Friedlich Marketing v. Carol Wright Sales*, 219 U.S.P.Q. 883, 888 (S.D.N.Y. 1983).”

iv. Alternatively, Applicant’s claims may be viewed as reading on a repetition of the structure disclosed by Takemoto: a repetition of a PD-array/wiring configuration that is formed in a common well. It would have been obvious to one of ordinary skill in the art at the time of the invention to have provided a repetition of Takemoto’s structures for the purpose of detecting larger areas of light; and it would have been obvious to one of ordinary skill in the art at the time of the invention to have disposed all of these repetitions in a common well for the well known purposes of simplifying the masking and manufacturing steps and/or to further enhance the detector’s miniaturization. *See e.g., In re Harza*, 124 USPQ 378, 380 (CCPA) (1960) for the proposition that “[i]t is well settled that the mere duplication of parts has no patentable significance unless a new and unexpected result is produced[.]”

v. Independent claims 11 and 21 have been further amended to now recite that a plurality of well-contacts are connected to said doped region and are arranged at a greater pitch than a pitch of said picture cells. Takemoto discloses a single well contact 28--as opposed

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to a plurality of contacts--connected to doped region 30 that biases the common well 25, which in turn, contains a plurality of pixels. As was explained previously and hereinabove, it would have been obvious to one of ordinary skill in the art at the time of the invention to have provided a plurality of contacts, instead of a single contact, connected to the doped region for any of various purposes, such as to provide redundancy, to reduce effective wiring resistance, or to insure more spatially-even biasing of the substrate. Please note the caselaw cited previously in this Office Action for the propositions that both the duplication of parts and the rearrangement of parts is generally obvious. Further, since Takemoto teaches that a single contact is employed for biasing the substrate region that is associated with a plurality of pixels (at a pitch greater than that of the pixels), it would have been obvious to one of ordinary skill in the art at the time of the invention to have provided plural contacts specifically at a pitch which is greater than that of the pixels' pitch to reduce the amount of material--and associated costs--required for forming the contacts, and to reduce the amount of space dedicated to the contacts regions, thereby balancing the well-known goal of enhancing device miniaturization with the goals that were set forth above that motivated the use of multiple contacts.

vi. Regarding dependent claim 18 that set forth photodiodes with CCDs for the photo-electric converting element, as was stated above, while Takemoto expressly sets forth photodiodes with FET switching elements instead of CCD switching elements, the reference states that various switching element schemes may be employed and that the FETs are just one possible example (col. 5, lines 30-45). It would have been obvious to one ordinary skill in the art

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at the time of the invention to have alternatively employed CCDs with the photodiode depending only upon conventional considerations such as the specific desired application and the associated manufacturing costs since in this context MOSFET and CCD switching elements are functionally equivalent, as evidenced by other references of record that disclose CCD switching elements.

vii. Regarding those dependent claims that further set forth particular colors and/or relational dispositions of the colors for each of the plural arrays or array groups, as was stated, Takemoto expressly recites mosaic patterns, but does not appear to expressly recite an array wherein each of various portions or array groups are dedicated to single, respective colors. Applicant acknowledges that it was known to set forth array groups in this manner. It would have been obvious to one of ordinary skill in the art at the time of the invention to have employed this known configuration depending only upon conventional considerations such as the particular detection application and the associated processing circuitry to be integrated with the detector. Further, as was explained in the previous Office Action, Needs et al. '756 provides evidence that it was well known to provide PD arrays with filters so as to be sensitive to R, G, B light respectively in the particular pattern set forth in claim 34.

Response to Arguments

3. Applicant's arguments with respect to the claims have been considered but are only partially persuasive.

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a. The arguments with respect to the Yu reference are persuasive, and the rejections thereover have been withdrawn based on the amendments.

b. However, Applicant's arguments regard the Takemoto references are not persuasive. Applicant has not argued against the Examiner's position that it would have been obvious to provide multiple contacts for biasing the common well. (See paragraphs 2(b)(i)-(v) and particularly subparagraph 2(b)(v) above). Rather, Applicant has argued that FIG 4 of Takemoto requires that a well-contact corresponds to each pixel. However, Takemoto's FIGs 7a-f, which correspond to a process for manufacturing the device of the invention of Fig 4 (col. 8, lines 5-7), shows that a well contact region 30 and associated contact 30 bias well 25 which, in turn, contains a plurality of pixels. As such, it would have been obvious to have provided a plurality of contacts in such a number that is specifically less than a 1-contact to 1-pixel ratio.

INFORMATION ON HOW TO CONTACT THE USPTO

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, **B. William Baumeister**, at **(703) 306-9165**. The examiner can normally be reached Monday through Friday, 8:30 a.m. to 5:00 p.m. If the Examiner is not available, the Examiner's supervisor, Mr. Eddie Lee, can be reached at (703) 308-1690. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.



B. William Baumeister
Patent Examiner, Art Unit 2815
June 16, 2003